DOCUMENT RESUME

ED 104 425 IR 001 829

TITLE	An Experiment in Conference T.V.
INSTITUTION	British Columbia Telephone Co., Vancouver.
PUB DATE	74
NOTE	93p.
EDRS PRICE	MF-$0.76 HC-$4.43 PLUS POSTAGE
DESCRIPTORS	*Communication (Thought Transfer); Evaluation; *Experiments; Innovation; Research; Technology; *Telecommunication; Television
IDENTIFIERS	British Columbia; Two Way Television; Vancouver; Victoria

ABSTRACT

Using business customers, a two-way television conference experiment was conducted between Vancouver and Victoria, British Columbia. Two-way conferences were conducted between telephone officials, businessmen and government officials, college students, elementary-school pupils and teachers, and a psychiatrist and clients. Discussion topics included administrative decision-making, idea generation, personnel and budget matters, sexual therapy between the psychiatrist and client, and classroom instruction. Participants were interviewed to determine their reactions afterwards. In general, it was concluded that the method was most successful with small groups at each terminal, in which interaction was necessary and nonverbal communication involved. Instructional use was least effective, communication being essentially one-way. Technical aspects of the experiment are described. Instruments used to determine reaction are appended. (SK)

an experiment in CONFERENCE T.V.

ED104425

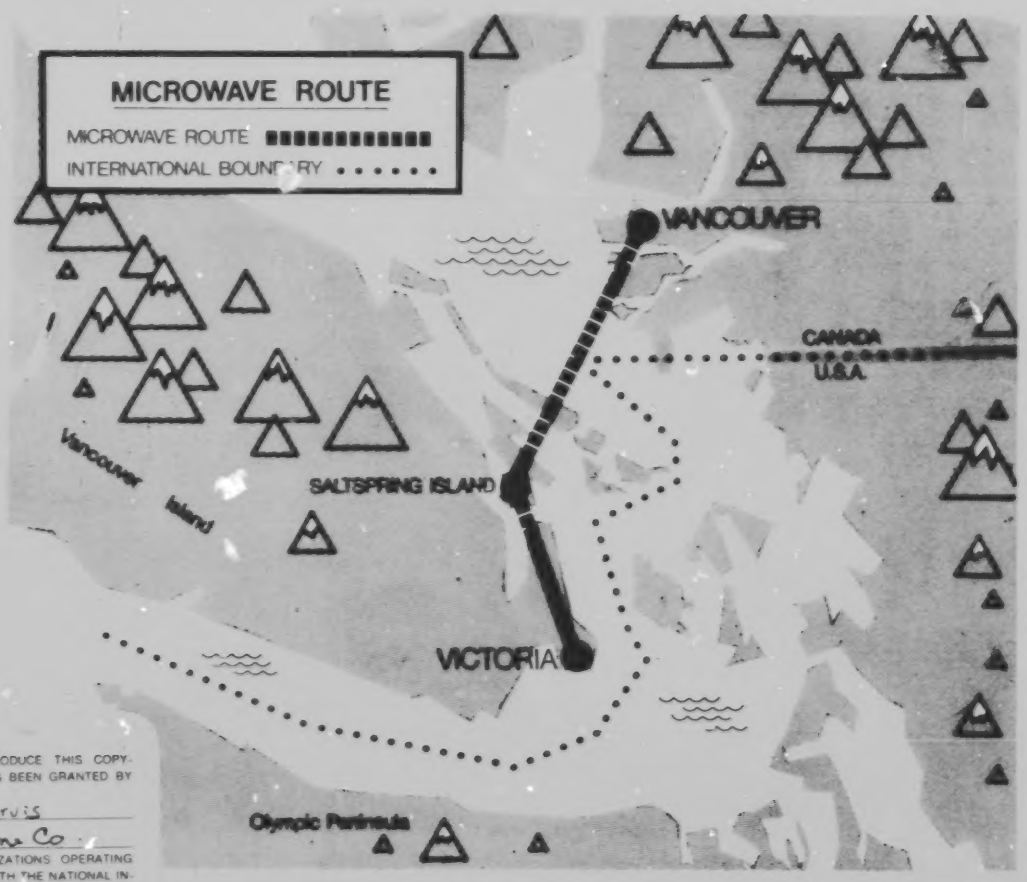
IR001 829

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

B.C. TEL

TABLE OF CONTENTS

	Pages
Foreword	2
Introduction	9
Summary and Conclusions	16
Behavioral	23
Technical	49
Appendix	57



PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY

M. J. Jervis
B.C. Telephone Co.

TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER.

foreword

The significant aspect of conference television is that it requires video transmission in both directions so that the participants at either end can see as well as being seen. This requirement for the transmission of broadband video and audio signals in both directions creates many difficult technical problems in the switching, transmission and terminal equipment portions of the network.

Since we are on the threshold of making some important decisions regarding broadband transmission networks within the city and between cities it becomes imperative to have a clear understanding of the market demand for two-way television facilities and a clear understanding of the most likely applications, customers, and formats. If we are able to determine that the actual practical requirements for two-way transmission is low, then specialized broadband networks can be designed for efficient one-way transmission and switching and we can therefore predict that such facilities will be used essentially for information dissemination or information retrieval purposes.

On the other hand, if a significant number of customers such as educational institutions, hospitals, businesses or governments require two-way visual communications for their own particular purposes, then advance knowledge of this will be of paramount importance in the technical design of our future broadband communication networks; in determining our relationship with the cable television industry; and in our attitudes and responsibilities towards other potential competitors. It will also have considerable influence on our posture to new telecommunications legislation proposed by the Federal and Provincial governments. In short, the real subject of our research is the two-way broadband transmission network. Our conference television trial between Vancouver and Victoria was an attempt to identify the most logical users of two-way visual communications and to obtain a better understanding of the most desirable terminal equipment format needed to encourage efficient communication.

The use of television in interactive communication over a distance is by no means a new concept and dates back to the 1930's. In the early 1950's, Bell Laboratories in the United States initiated a large research and development program to produce the Picturephone system. This project involved not only the design of the sophisticated two-way terminal device but also a transmission and switching system based on digital transmission at the 1.5 megabit rate. In order to make the system compatible with existing telephone transmission systems, Bell Laboratories reduced the picture raster to 250 lines and compressed the video signal to 1 megahertz. These techniques resulted in a picture of low resolution in a format suitable only for a head and shoulders view of the user. The final system, placed in service in July of 1970, was a notable technical achievement but within two years it became obvious that there was little market demand for the service. This was probably due to the format of the Picturephone terminal which was an extension in concept of the existing telephone instrument, and which could not be used for groups of people or for the proper display of documents or other graphic material.

Another approach to two-way visual communications (typified by Confravision in the United Kingdom and the Conference Television system operated by Bell Canada in Ontario and Quebec) provides a public walk-in type television studio so that meetings can be held with participants in different cities, provided that they assemble at the conference television locations.

During the last five years, interest in the subject has mushroomed and many agencies are conducting a variety of tests and trials. In Canada, research is under way at Carleton University, at the Communications Research Council, and in the Department of Communications. Research has been done in Sweden by the Stockholm School of Economics and L.M. Ericsson, in Holland by Philips

Research Laboratories and in Australia by the Australian Post Office. The First National City Bank in New York has had a private system in operation for ten years and a similar system is in use in Japan. New York Tel, Bell Labs and CBS Labs in Stanford, Connecticut have all been involved in this type of research.

B.C. Tel became involved in a conference television experiment because of the lack of information on the potential impact of specialized two-way conference television systems and the possible need to develop broadband networks. During the trial we used the name Confravision, however for this report, we preferred the generic name conference T.V. which is used throughout, except in the appendix which contains a copy of the questionnaire.

Various departments at B.C. Tel have had considerable experience in a variety of television applications. B.C. Tel provides network video channels, broadcast video pick-up service, and industrial closed circuit television. In addition, specialized personnel have participated in the development of educational television, and have successfully implemented an information display system in the Vancouver Stock Exchange. These applications characteristically use one-way video transmission, and do not place any great burden on the majority of users to participate in the production process. Two-way video service, in which being viewed is as necessary as viewing, places a new psychological strain on the participants. Viable uses for this type of service will be found only after careful research into the behavior of people using such a facility.

We observed that in spite of the thorough engineering and professional appearance of the studios, previous approaches were far from successful in attracting paying customers. However, considerable evidence remained that there would be a need for two-way television transmission if the proper market environment and terminal format

could be identified. We decided to try a different approach. It was based on the theory that public terminals were inconvenient for most people, and being designed for general purpose applications, failed to solve specific communications problems. We felt that in its final and functional format, two-way visual facilities must be convenient for the user, that is, in his conference room, on his office floor, in his firm or within his building.

We felt that the format of the terminal equipment must be specifically designed and constructed to meet the special requirements of the user, therefore the terminal equipment for a conference room in a business should be expected to be substantially different from the equipment format used in a hospital or from that used in a school or in an industrial manufacturing plant. We expected that the role of the common carrier would be to provide the transmission and switching only and that the design and provision of the terminal equipment would be the responsibility of the customer.

We tried to avoid pre-conceived ideas of the optimum size of a two-way visual transmission network. Although our trial was conducted between Vancouver and Victoria, 57 miles apart and separated by the Strait of Georgia, we felt that the most desirable network might be entirely within the downtown core or within the city; connecting office to office, hospital to clinic, or university to junior college. At the same time conference television might experience high demand between countries where travel costs and time adjustment are major considerations. We were therefore well aware that the least desirable distance over which to provide conference television might well be within 500 miles, typical of the distance between adjacent major cities in Canada.

Having defined the framework for our trial between Vancouver and Victoria, we selected the business community as being

the major source of participants and constructed facilities in centrally located office buildings in Vancouver and Victoria. We tried to visualize the most desirable format for two-way television equipment if installed in a typical business conference room; thus our facility was relatively compact, had a large conference table and was equipped with blackboards, flip charts and a slide projector. The system was not established as a permanent service offering nor was any consideration made of full time cost or rate structures.

In accord with our premise that the most useful form of two-way visual communications systems will involve terminal equipment constructed especially for the users' particular needs, and located on or close to the users' premises, our Vancouver to Victoria trial attempted to simulate a conference room as might be found in any medium-sized company. We attempted to make the television equipment as inconspicuous and as automatic as possible, and minimize the number of buttons to push. We wanted the participants to feel comfortable, we did not want them to be conscious of being "under lights" or "on camera". To encourage this atmosphere we chose to use only one main camera and a single main monitor, both mounted flush in the wall opposite the conference table. Because there would be only one camera, with no provision for changing the field of view or switching between people, we elected to get the best possible quality and selected a broadcast quality plumbicon camera and a broadcast quality video monitor. The fixed lens on the camera provided a field of view sufficient to cover four people seated at the conference table. We were interested in finding out if the high quality camera/monitor combination would compensate for the broad field of view and the inability to get a close-up view of any of the participants.

The most popular theory concerning the use of television in personal communication emphasizes the need to clearly see facial expressions, the eye, the mouth, etc. on the assumption that some non-verbal communication would then take place between the participants. This also assumes that the non-verbal communication will be emanating from the speaker -- therefore in many conference television installations multiple cameras are used to obtain a close-up view of the speaker. We postulated that the other people in the conference room who were not speaking might also be the source of important non-verbal information. In fact, we would go as far as to say that the entire conference room contains information that is relevant to the viewers at the other end. The single camera and lens system produced such a view of the entire room.

We believe this proved to be an important concept because the image on the monitor mounted flush in the conference room wall giving a view of the entire conference room at the other end of the system produces an effect similar to looking through a small window into the other conference room. Unfortunately, in our trial the relatively small size of the monitor limited this window effect but with a considerably larger screen size and appropriate room dimensions, an environment could be created in which the participants at each location would feel they were viewing each other through a large window. With considerable attention to the audio facilities, the technical barriers to complete and open communication would be virtually non-existent. For a multi-person conference, a full high quality view of the other conference room is likely to be more important than a close-up view of the specific person speaking at the other end.

The results of the trial appear to support the original premise that the requirements for two-way visual communication will be limited to specific types of customers and that their

applications will be specialized. Therefore, future use of conference television facilities will depend upon the development of broadband transmission and switching facilities that will reach the specialized locations within a city to access and connect individual customer locations. Perhaps the first area of development of two-way transmission facilities will be within the city core and that from this development will come the need for inter-city transmission capabilities.

I would like to thank Dick Ford for coordinating the marketing support and direction in this experiment, Al Gomez and John Steeves for the engineering; Norm Leece who designed and constructed the conference rooms, Gordon Hine, Lionel Edwards, Walter Sandhoefner, Dave Mah and the many people in our plant department who made the system work; Dianne Shatzko and Laurel Dack who were our receptionists; Ken Olson for the graphics; Freydis Welland and Bob Eldridge for editing and in many places rewriting this report and Anders Skoe who undertook the heavy load of gathering and analyzing the behavioral data.

If you would like further information please contact Anders Skoe at 604-688-8932 or myself at 604-662-2918, or by mail at 768 Seymour Street, Vancouver, B.C., Canada, V6B 3K9.

Mike Jervis
Vancouver, British Columbia
1974

introduction

In October and November 1973, the British Columbia Telephone Company conducted an experiment in two-way television communications. The reasons for the experiment were to collect behavioral information from people using the system; to evaluate the need for a visual component in the communications process; and to make some judgments about the potential future markets for two-way conference television.

The B.C. Tel conference television trial was specifically planned for the business community, since it was based on the assumption that in the future, many conference rooms in large corporations would be equipped not only with audio-visual facilities but also with provisions for two-way television transmission. The facilities in the trial were intended to simulate such future business conference rooms.

Two conference rooms in convenient office buildings, one in Vancouver and the other 57 miles away in Victoria, were connected visually and aurally to permit groups to interact with one another in simulated "face-to-face" meetings. The location, decor and design of the conference rooms were carefully thought out to create the most realistic atmosphere possible, and the people asked to participate in the experiment were encouraged to hold genuine meetings. They did. Meetings varied from business topics involving information exchange, idea generation, decision-making, personnel and budget matters, to sexual therapy involving a married couple and a doctor whom they had never met face-to-face. The conference television system was also used by students, both at the university and elementary school level.

Behavioral information was primarily gathered through interviews, observation and questionnaires. To aid in the process of evaluation a special room was provided so observers could monitor

picture and sound from both Vancouver and Victoria. Participants in the experiment were told that their reactions might be observed, but were given the opportunity to have privacy if they desired.

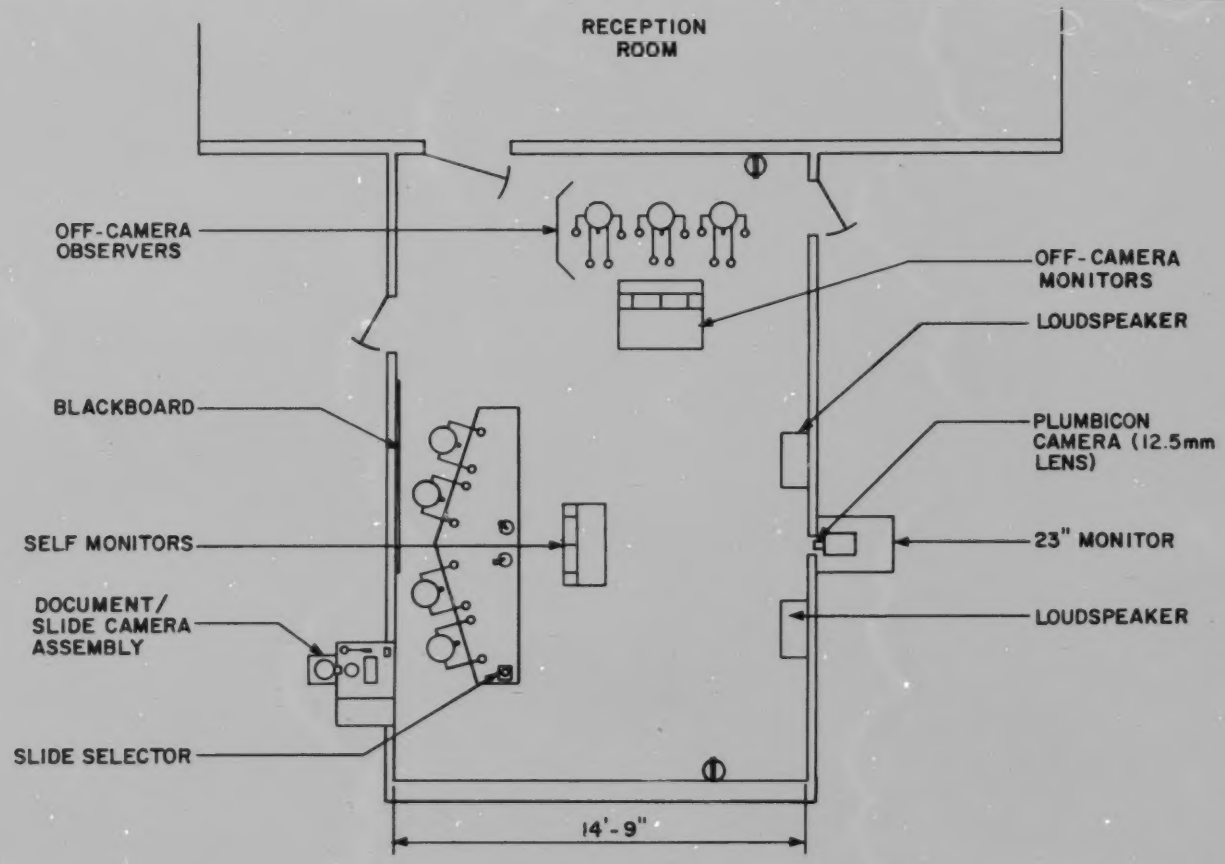
To be as realistic as possible, the conference rooms were established in downtown office buildings separate from telephone company locations. Upon arrival, the participants entered a reception room which contained a receptionist's desk complete with credenza, typewriter, telephone and facsimile equipment, and an appropriately decorated waiting area with coffee tables, chairs, lamps, magazines and pictures. The receptionist welcomed the participants and offered them coffee while they were waiting for their meeting to start. If required, she was able to perform any secretarial tasks needed by the conferees, e.g., taking messages, typing notes, transmitting facsimile copies. The intention was to create a normal business atmosphere, and this philosophy was reflected in the design and layout of the conference rooms.

In keeping with the business theme, all technical apparatus was hidden from view, and the conference rooms were carefully designed and decorated to give an impression of permanence. Although the trial was conducted for just six weeks, it was important that the atmosphere be a real one, and that the participants not feel they were part of a makeshift experiment.

The conference rooms were carpeted and furnished with comfortable chairs and a specially shaped table with antique oak finish. Normal overhead lighting was used to provide a natural environment for those taking part. The atmosphere was comfortable and business-like.

Before the meeting started the receptionist briefly explained to the participants how to operate the auxiliary equipment for 35mm slide and document transmission, and speakerphones to permit addition of a third group to the conference. It was not necessary for the participants to adjust picture and sound levels; these were normally adjusted once a day by technical personnel.

Once seated, the participants faced the camera and three black and white television monitors: a 23 inch screen gave a view of the people at the far end, an 11 inch monitor displayed the picture being transmitted to the far end, while another reproduced the output of the local document camera.



The wall opposite the conference table was built to contain the 23 inch television screen and the television camera. The conference table was arranged so that up to four participants could view the screen comfortably, while at the same time being viewed by the television camera. The camera was equipped with a lens of fixed focal length suitable for a broad view of several participants. However, on occasion, when only one or two people were using the system, a close-up lens was used to capture facial expression more readily.

A document viewing camera was built into the wall behind the conference table and was designed to work with documents, 35mm slides or small objects. A remote selector was handy so that the participants could change slides on a random access basis.

Two microphones were placed on the conference desk and one in the document camera cubby hole. Loudspeakers at the front of the room reproduced the sound from the far end.

The conference room in Vancouver was designed to accommodate three off-camera observers. The observation area was equipped with one 14" monitor showing the picture being sent from Vancouver, and another showing the picture from Victoria.

Despite the care which went into location, layout and design of the conference rooms, a number of problems became obvious as the trial was carried out. These are discussed in the technical section and in the conclusion.

PARTICIPANTS

To obtain realistic behavioral information from people using conference television, it was necessary to generate genuine and purposeful meetings on subjects that were not related to conference television technology. Obviously, meetings in which the participants simply discussed the medium would have limited value. A survey of the local business community identified those companies with administrative offices or branches in both Vancouver and Victoria. Since people in these companies were likely to meet frequently in the routine course of business, they would be the most fertile source of participants.

A list of 39 organizations was compiled on the basis of need to travel between the two cities. In addition to these prime prospects 60 other organizations were invited to inspect and use the facilities. All but two of the participating organizations came from the first list.

An introductory letter was sent to each company, and was followed by a phone call to arrange for an interview. This preliminary interview was used to describe the conference room facility in detail. Prospective participants were asked if they would object to being tape recorded and monitored by the behavioral analysts. Most of the people contacted were interested in B.C. Tel's conference television trial. Altogether, 195 individuals participated in 22 meetings and many more people inspected the facilities. The latter were not asked for their opinions about the system.

Of those who declined to participate, 80% stated that they either had no need to talk and/or meet with anyone in Victoria or, that for now, the telephone satisfied their communication requirements. Approximately 10% were enthusiastic about using conference television but eventually declined because of lack of interest within their organization. Of the remaining 10% about half said they were interested in such a facility from Vancouver to Winnipeg, Toronto, Montreal and so on, but not to Victoria. The others were interested enough to have a look at the facilities but did not arrange a meeting. Several organizations expressed a definite interest in using conference television but the right occasion did not present itself to them during the trial period.

The conference television trial was given excellent coverage by the news media in both Vancouver and Victoria. However, the response was in stark contrast to the coverage. Not one inquiry resulted, even though it was emphasized that there would be no charge.

B.C. Tel employees, business people and government officials constituted the largest group of users, with a total of 19 meetings, 151 participants, and 89 completed questionnaires. University of British Columbia students who were studying "Media in Education" adopted conference television as a class study project. A class of 22 ten-year old elementary school pupils used the facility, but were excluded from most of the analyses. The success of the counselling session between a young married couple and a psychiatrist revealed an important area for future application of two-way television.

MEETINGS, PARTICIPANTS & QUESTIONNAIRES

	Number of Meetings	Participants			Returned Questionnaires
		Vancouver	Victoria	Total	
B.C. Tel	10	43	42	85	46
Businessmen and Government Officials	9	37	29	66	43
UBC Students	1	16	3	19	15
Elementary School Pupils	1	22	0	22	22
Psychiatrist & Clients	1	1	2	3	2
TOTAL	22	119	76	195	134 (68.7%)

summary and conclusions

Broadly speaking, the results of the trial confirmed the basic premise that two-way visual communications will be most useful for specific types of customers, and that the applications will be specialized. For example, a psychiatrist stated that he could achieve the same quality of therapy via conference TV as in a face-to-face session, and that no more research would be necessary to confirm that aspect. Provision of the terminal facilities would be economically feasible for most companies and institutions, therefore the future use of conference TV will depend on the development of broadband transmission and switching facilities.

It was clearly demonstrated in the trial that when large numbers of people assemble at either end the need for two-way visual communications decreases considerably. For example, in the case of the class of 18 students in Vancouver with the professor and 2 students at the Victoria end, communication was essentially in lecture form and used one direction of transmission only. However, when the number of people involved was reduced substantially, the two-way communications system became effective. The most effective use of the system occurred when only two or three people were present at each location, and the most successful occasion was the personal counselling session between a psychiatrist and his two clients.

BEHAVIORAL

From the behavioral point of view several interesting conclusions were reached. Generally, participants expressed positive reactions to the system. However, due to the small sample, it is difficult to reach statistically "valid" conclusions about conference TV. Some of the tendencies indicated in this study may suggest possible hypotheses which could be tested in further studies. All the following statements should therefore be prefaced with "it may be suggested" or "users tend to", etc.

A small proportion of the participants, mostly the students, missed the fact that conference TV was two-way. They sat back, waiting to be "entertained" by the people at the other end, rather than interacting with them. The students' behavior might be indicative of passive "watching" learned through years of experience with broadcast TV.

There was quite definitely a "learning process" involved in using conference television. Initially, the participants were engaged in learning and experiencing the new technology, and it was not until some time passed that they forgot the medium and became immersed in the subject at hand.

Those people who used the conference television facility more than once reacted the most favorably towards it, and it may be that this resulted from their greater familiarity with the medium.

Several other factors affected the reaction of participants. These included the length of the meeting, its size, location, and reasons for holding it, people's background, and their desire to travel.

When questioned about their reactions to conference television, participants frequently made comments related to cost. The people using the system were doing so without charge and it is thought that their opinions reflect that fact. They thought that conference TV could become a substitute for travel only if it could be priced at the same level as travel and accommodation. As expected, participants' responses to this question correlated with their own desire to travel.

Several interesting conference TV behavioral phenomena were observed. Unique jokes were created. Several groups, unaware of each other's experiences, invented the same jokes. They offered each other cigarettes and cups of coffee over the system.

Despite the humor, the people using the conference TV system became polarized into two groups -- one at each end. Some participants felt that the system created a feeling of confrontation. Also, on observation, there appeared to be less communication between the members of each group than would be expected in ordinary meetings, contrary to their stated reaction that it was not difficult to talk to people at their own end.

One way to study the phenomenon of polarization empirically may be to videotape the sessions and count the number of transactions which take place between people. Then communication could be objectively measured between terminals (BT) as well as within terminals (WT). Researchers could thus obtain ratios of BT/WT comparing various types of conference TV meetings and face-to-face meetings involving distinct groups of people.

No doubt the dynamics of conference TV meetings depend on the configuration of equipment and terminals. An interesting alternative to the two-terminal conference TV approach would be to set

up several one-person interconnected terminals, similar to conference television calls. A special effects generator could split each person's TV screen to show the images of every participant at once. If two distinct groups meet in this mode it may be found that polarization between groups would not occur to the same extent as in a two-terminal mode.

Most people agreed that conference TV did not make them feel self-conscious, but their behavior appeared to contradict their stated reaction. Each group tended to "perform" for the group at the other end and behavior was formalized. Some participants spoke as if they were giving a speech to an audience. In spite of the fact that the groups were not charged for using the system, they behaved as if time were important.

Several people expressed dissatisfaction with the lack of eye contact due to the distance from the monitor, its size and the camera lens used.

Most participants felt that conference TV provided an adequate feeling of privacy, but they would not want to discuss confidential matters via the system. Most people felt strongly that they would be afraid of using the system for information which may end up in the wrong hands.

Conference TV gave a feeling of personal contact and a sense of realism. Most people felt certain about who was at the other end. There was strong agreement that it was easy to tell whether people at the other end were following the discussion.

The participants were evenly divided on the issue of efficiency. The participants for whom the system was designed, i.e.

business groups, government officials, etc., felt that conference TV would produce faster decisions than face-to-face meetings. All groups agreed that conference TV makes meetings shorter. Most people agreed that conference TV is convenient for busy people, thereby perhaps saying that it may serve as a substitute for travel.

It was agreed that the equipment did not distract from the discussions, but most participants felt that conference TV required more concentration than face-to-face meetings. However, they did not feel that regular use of conference TV would be strenuous.

Generally, participants felt that the atmosphere of face-to-face meetings would be more extreme than conference TV in the sense that the atmosphere of face-to-face meetings would be more friendly, business-like, informal, competitive, serious, cordial, heated, lively, constructive, aggressive and cooperative; and less cautious. The atmosphere would be neither more nor less emotional, antagonistic, hostile and cooperative in face-to-face meetings.

When comparing three forms of communication, namely the telephone, conference TV and face-to-face, there were some surprising results. On a scale of quality of communication from the telephone at one end, to face-to-face at the other, it was expected that conference TV would be an improvement over the telephone, but closer to the telephone than to face-to-face. It was found, however, that conference TV was considered by the participants to be closer to face-to-face than to the telephone on that scale; i.e. the improvement of conference TV over the telephone is greater than the improvement of face-to-face over the conference TV for most types of communication.

TECHNICAL

Audio system performance is crucial to the success of any conference. The microphones should be sensitive enough to give the participants some freedom of movement. Natural sound quality is important, however it was apparent that with some attention to equalization and a good speaker system, a standard voice grade channel provided adequate response. Serious distractions resulted from low incoming sound level, low microphone sensitivity and the voice actuated switching which was necessary to eliminate feedback. Acoustic treatment of the walls is mandatory for acceptable audio system performance.

It was necessary to use a high quality Plumbicon camera in order to have a picture with excellent focus and resolution right to the edges. However, the Plumbicon is unable to handle wide variations in scene contrast. If the camera is properly adjusted for the highlights generated by white paper or white clothing then it is likely that there will be low contrast on the faces of the participants. Proper illumination must be achieved so that the facial tones are centered in the contrast range with no peripheral highlights which cannot be handled by the Plumbicon. Surface illumination from the ceiling can produce high reflections from documents on the conference table and must be matched to the lighting on the participants' faces.

The document camera arrangement proved successful but would have been more useful if the camera had been mounted in the ceiling directly over the conference table. The polacoat screen could then be an integral part of the table top, with the slide projector mounted in a compartment within the conference table. An electric zoom lens with controls at the table would provide the flexibility

to view small objects, typewritten documents, handwriting or large drawings.

There is a strong tendency to choose the desk format or heavy rectangular table when designing conference facilities. This may be incorrect. A round table that is as low and compact as possible would be more flexible for the participants and less dominant in the television picture as viewed at the opposite location.

behavioral

The most important activity of the experiment was to gather data about the participants' reaction to two-way conference television. Although the system was designed with business groups in mind, it was used by other groups as well: health, education, government departments, etc.

Participants were invited to use the conference TV for genuine meetings, and in most cases the system actually was used as a substitute for travel, conference telephone calls, or some other method of communication. Most of the participants were business people exchanging information, generating ideas and discussing personnel and budget matters. A doctor counselled a married couple, and a group of university students carried out a class assignment. A group of ten-year-old elementary school pupils also used the system; however their reactions are excluded from most of the analyses below. None of the groups were charged for the service, and this may have influenced their stated reactions.

This section of the report discusses the methodology used in the behavioral study, summarizes the quotations from participants, and analyzes the responses to questionnaires and interviews.

METHODS OF COLLECTING INFORMATION

Five complementary methods were used to analyze the behavior of participants in the meetings. In addition to traditional social science techniques, i.e. questionnaires and formal statistical analysis of results, other, more intuitive study methods were used as well. Some groups were subjected to observation, both from a remote studio and the conference room itself, some were interviewed, and others were videotaped. One group asked for complete privacy, which they were guaranteed, and the remaining groups were interviewed, videotaped and observed on a random sample basis. In addition, in order to give the analysts a "feel" for the medium, they conducted genuine meetings themselves via the conference TV system.

QUESTIONNAIRES

The questionnaire was based on one developed by the Communication Studies Group, University College, London, England, and later modified by the Canadian Department of Communications, Bell Canada and B.C. Tel. The questionnaire, which was designed to be filled in anonymously, was distributed to all 195 participants immediately after their meetings. A total of 135 were returned and subjected to computer analysis.

INTERVIEWS

The analyst interviewed randomly selected groups upon completion of their meetings. These interviews were relatively unstructured so that benefit could be derived from the process of free association between the thoughts of various members of the group. For example, one person's reaction to a point, would generally trigger thoughts in the minds of other participants which either confirmed or opposed the initial opinion.

OBSERVATION

During the initial planning stages representatives from each group were asked whether they would object to observation by analysts during the meeting. Only one group wanted complete privacy. Analysts were able to observe the meetings from either of the two conference rooms, or from a remote studio which was equipped with a special monitoring console for receiving video and audio output from both cities.

The remote studio was set up so that analysts could observe the behavior of participants without disturbing the meeting, but there were no apparent differences in behavior between those occasions when the analysts were observing from the remote studio, and those when they were actually in the conference rooms themselves. Observation from all locations provided valuable information about the non-verbal actions of the participants as perceived by the analysts.

VIDEOTAPES

Some meetings were videotaped, and those records proved useful to the analysts as they were able to study the reactions of the groups and individuals in depth.

PERSONAL EXPERIENCE

The analysts themselves held some of their meetings via conference TV in order to personally "feel" the medium. This approach helped the analysts better evaluate the reactions of other users.

CONFERENCE ROOM ARRANGEMENTS

BUSINESS MEETINGS

As the conference TV system was intended primarily to be used for business meetings, the conference rooms were designed and furnished especially for this type of group. Each location could accommodate four people on-camera, with extra chairs for a small number of off-camera observers. Meetings could thus be conducted without disturbance from operating personnel or technology. The auxiliary equipment consisted of a document camera, a slide projector, facsimile transmission equipment, a speakerphone, a blackboard and flipcharts.

UNIVERSITY CLASS

The experiment involving the university class required changes in the Vancouver conference room. In order to accommodate between 15 and 20 students, the conference table was removed and the students were seated within camera range. This resulted in an unusually crowded incoming picture in the Victoria studio.

SEXUAL THERAPY SESSION

To make a more intimate environment, the conference tables were removed from the meeting rooms, and the couple were seated in front of a small coffee table. The result was quite a cosy atmosphere. Both the psychiatrist and the clients were seated within six feet of the camera. In addition, a different lens (25mm as opposed to 12.5mm) was installed to provide a close-up view at each location.

BEHAVIORAL FINDINGS

The behavioral findings resulted from five different information gathering techniques. The results of each confirmed the other -- except for a few isolated instances. One notable exception was the participant whose observed behavior contradicted her stated feeling about the system. She said that conference TV was dull. After a short time she was deeply engaged in an animated discussion with the people at the other end of the system on how uninteresting it was! Her questionnaire and interview bear out her statement that it was uninteresting whereas her observed behavior contradicted it.

The findings are described according to the most relevant information gathering technique: observation, interviews or questionnaires. The remaining methods of gathering data, namely personal experience, and videotapes, were used by the analysts to interpret the results from the others.

OBSERVATIONS

Some people missed the two-way aspect

Basically, the conference TV system was designed as a two-way interactive, real-time communication medium. A small proportion of the users, mostly the students, missed the fact that it was two-way. The students' behavior seemed to indicate that the customary passive "watching" was learned through years of experience with broadcast TV. They wanted to be entertained by the people at the other end, rather than interact with them. It is interesting to note that all the students were members of a post-graduate class in "Education and the Media".

Some reasons for varying reactions

People participating in business meetings appeared to react more favorably than other users to the conference TV system. This was expected as the system was designed for them. However, there were other reasons for the business people reacting favorably. They held genuine meetings, in which factual information was exchanged, auxiliary equipment used, and the participants became absorbed in the subject at hand. It appeared that the medium became forgotten as long as ideas, facts and concepts were communicated. On the other hand, other groups tended to make evaluation of the system a part of their meetings. In addition, towards the end of the trial, the analysts felt there were not enough users, and therefore, in order to broaden the base of the study, they invited other people to try and find a use of the system. Those people who were not participating in a genuine meeting, did not have the same chance of getting absorbed in the subject matter and consequently spent more time evaluating the system.

"Face-to-face" counselling

An intimate counselling session was arranged between a married couple in Victoria and a Vancouver psychiatrist. Although the psychiatrist and the couple had never met prior to the session, it was considered a great success by both parties.

For this particular experiment, 25mm lenses were installed on both cameras to provide close-ups of the three people involved. This enabled the doctor to readily detect non-verbal behavior on the part of his clients. He also found it easy to maintain eye-contact with them. This simulated face-to-face situation was achieved by carefully positioning the TV cameras immediately above the monitors showing the incoming picture. Therefore, when the psychiatrist looked at the image of one person on his monitor, it gave that person the feeling that the psychiatrist looked directly at him. When he looked at one of them in this way, without saying their names, there was no confusion on the part of the clients as to who was being addressed.

When the counselling session was over, the psychiatrist stated that he could achieve the same quality of therapy via conference TV as in a face-to-face situation. In fact, he felt intuitively that no more research was necessary to confirm that aspect. The only problem is the cost of extending a similar system to other centers.

Polarization

It appeared that the people using the conference TV system became polarized into two groups -- one at each end. In addition, each group tended to "perform" for the other group. Also, there was less communication between the members of each group than would be expected in ordinary meetings.

Humor

Using conference TV encouraged the creation of unique jokes. Several groups, unaware of each others' experiences, invented the same jokes. They offered each other cigarettes and cups of coffee over the system.

Cost of the service

In general, the participants reacted in favor of the conference TV system. However, their comments were frequently related to cost. It was thought that conference TV would be a substitute for travel if it could be priced at the same level as travel and accommodation. Other people stated that it would be competitive if it was less expensive than travel and accommodation plus time saved. All 195 people using the system were doing so without charge, and probably their opinions reflect that fact. It is impossible to say how much this influenced their reactions, but it should be kept in mind when evaluating the results.

Travel-Communication substitution

The majority of meeting participants felt that conference TV could become an actual substitute for travel. However, when probed a little further, some felt that conference TV would not necessarily substitute for, but complement travel, whereas others felt it would increase travel.

The subject has been studied systematically by Bell Canada's Headquarters Planning Group, and other researchers. So far, the results of the studies are generally inconclusive, but it appears that television conferencing is complementary to travel, rather than a substitute for it.

Eye contact

In most sessions the 12.5mm lens was used and four individuals were on-camera at once. Several people felt there was insufficient eye contact and that the apparent distance between the participants was excessive. However, the 25mm lens used for the psychiatrist and the couple was sufficient to approximate face-to-face eye contact.

Comforable, personal conversation appeared to be a function of eye contact, in the opinions of participants. Eye contact, in turn, is a function of the apparent distance between people as determined by the camera and the TV monitor.

Formalization of behavior

Using the conference TV system seemed to "formalize" behavior. Formal behavior is deliberate, "correct" or proper, efficient and ceremonial. Some participants addressed small groups as if they were giving a speech or lecture to a large audience. In spite of the fact that groups were not charged for the use of the system, they acted as if time were important. Formalization seemed to result from an attempt at efficiency and proper usage of the technology.

Video tape recording caused no concern

Representatives from each group were made aware that their meetings might be videotaped, and two groups were told that their particular meetings actually would be videotaped. Judging from their behavior they soon forgot about the VTR, which they could not see as it was operated in the remote studio.

When being interviewed after the meetings, only one person expressed concern about the videotape (one of the clients of the counselling session, who said he was uncomfortable when discussing certain aspects of his personal life). He was assured of the confidentiality of the one and only videotape, which was given to the doctor who conducted the session.

INTERVIEWS

The interviews were held immediately after the conference TV meetings, in order to capture the reactions and impression while they were still fresh in the participants' minds. A random sample of five groups out of 22 were interviewed, and reactions were as varied as the groups. Business people, students and B.C. Tel employees were represented. The interviews were informal and unstructured. The major thrust of the questioning was similar in every interview, but each different situation determined the direction and scope of the specific questions.

In every case the entire interview was audio-taped. It was noticed that the people were at first very aware of being recorded. They looked at the microphone, addressed it directly, etc. However, after a few minutes, they behaved as though they had forgotten the tape recorder.

The interview results compared closely with the results from the questionnaires. In other words, the expressed opinions of the participants as given to the B.C. Tel interviewer, were consistent with the feelings described in the anonymous questionnaires.

The students were considerably more critical of the conference TV than the businessmen and B.C. Tel staff. However, when evaluating their comments it must be remembered that they had many more people in the conference room than any other group. The students said that they felt passive in the meeting, and antagonistic towards the screen. They felt that the fact that the eyes of the people at the other end could not be seen distinctly was rather unsatisfactory. Some students said that conference TV was not of much use as an educational medium. Others felt that the system

was not suitable for them because it was primarily designed for business use.

The business people reacted more favorably towards the system -- many could see it as a useful substitute for travel. Some had reservations about the "privacy" of the system, whereas others felt that using conference TV was no different from using the telephone in this respect. The business people also felt that meetings over conference TV were shorter than face-to-face meetings, and that the system made them more precise in their communications. Some individuals felt that the system allowed non-verbal communication to take place, but that the people did not come across as "strong" as in face-to-face situations.

One person noted that he treated the TV monitor as a "power position". He felt that most meetings have a focal point toward which the attention of the participants is naturally directed, and in the TV conference the incoming picture was such a focal point. This supports the observation that the conference TV system created polarity between groups, and seemed to inhibit interaction between people who were in the same room.

Some participants felt that, as with any type of technology, it is necessary to go through a learning process. Initially, the participant is engaged in learning and experiencing the new technology, and it is not until some time has passed that he can forget the medium and enjoy the subject at hand.

QUESTIONNAIRE

In the appendix is a copy of the questionnaire developed and used by the analyst. The questionnaires, which were designed to be filled in anonymously, were distributed to all 195 participants immediately after their meetings. A total of 135 were returned and subjected to computer analysis. A few caveats must be mentioned with respect to the questionnaires: of the 135 returned questionnaires, not all were filled out completely; B.C. Tel employees made up the largest single group of users and were included with business groups; of the group called clients, there was only one questionnaire; perhaps some people answered what they thought B.C. Tel wanted to hear, especially since they were not charged. The following four sections describe the results of the closed-ended questions.

OPINIONS ABOUT THE CONFERENCE ROOMS AND EQUIPMENT

Distance from monitor too great

Most participants agreed that the distance of 12 feet between them and the 23 inch monitor was too great.

Image size of distant conferees too small

All users agreed that the image size was too small.

Picture quality satisfactory

Judging the resolution, all users agreed that the quality of the picture was satisfactory. (The picture was regular broadcast black and white quality.)

Mixed reaction to document camera

Opinions about the document camera varied between groups. Some groups felt that it was satisfactory, and others felt that it was unsatisfactory. The opinions varied according to the type of use. Those groups who used large documents and drawings felt that it was unsatisfactory, whereas those groups who used smaller documents and slides were satisfied.

Voice quality acceptable and volume too low

Most groups were satisfied with the voice quality, but felt that the volume was too low. However, representatives from the media, mainly radio stations, felt that the voice quality was unsatisfactory. Another exception were the business groups who felt that the volume was acceptable.

Room furnishings and lighting satisfactory

All groups agreed that the furnishings and lighting of the conference rooms were almost completely satisfactory. It is believed that the fact that the rooms were designed as regular conference rooms with very little evidence of the technology involved and normal lighting, etc., was important in this respect.

FACTORS DETERMINING THE REACTIONS OF PARTICIPANTS

Familiarization

Those who participated more than once reacted more favorably than first-time users.

Size of meeting

The smaller the meeting, the more favorably the users reacted.

Length of meetings

There is a slight correlation between short meetings and positive reactions to conference television.

Reasons for meetings

Reasons for meetings appeared to be important determinants of reactions. Conference TV is good for information exchange, personnel matters, idea generation, problem solving discussions and personal counselling.

Meeting location

In spite of the fact that the Victoria studio was smaller in size, and slightly inferior in decor to the Vancouver studio, Victoria users reacted more favorably towards the facility. Almost any factor could account for this -- perhaps Victorians generally have a better attitude than Vancouverites!

Desire to travel

People's reactions varied according to whether they desired more, the same or less travel than normal for them at the time of completing the questionnaire. Those who desired less travel reacted more favorably to conference TV than those who desired more.

Background of groups

People's reaction to conference TV seemed to vary in accordance with their background. The business people, and the psychiatrist and his clients reacted more favorably than others. The least favorable reaction was from the university students.

STATEMENTS ABOUT CONFERENCE TV

Confidentiality was a concern

Most people said that they would not want to use the system to discuss confidential matters.

Personal contact was felt

Most people felt strongly that the TV conference gave a feeling of personal contact during the meeting. Several stated that it was almost as good as meeting face-to-face. However, a discrepancy between stated feeling and behavior was revealed later. A few individuals, when they met face-to-face for the first time, after having "met" via TV, did not recognize each other until they were "re-introduced" by name.

Easy to use

Practically everyone agreed that the medium was easy to use. The conference facilities did not require any switching or operation on the part of the participants.

Certainty about who was at the other end

Most people felt certain about who was at the other end. Curiously, those who used conference TV more than once did not feel as strongly about this as the first time users.

Remote studio was no problem

The conference TV studios were located in downtown offices in both cities. They were neither in B.C. Tel premises nor in users' premises. Most people felt neutral about this subject, if anything they felt that it was not particularly inconvenient.

Confrontation

Some felt that conference TV created a feeling of confrontation, and about the same number felt that it did not. Specifically, business people, members of the media and elementary school pupils felt that the medium created a feeling of confrontation.

Good comprehension

There was a strong feeling of agreement that it was easy to tell whether the people at the other end followed the discussion.

Face-to-face meetings would not produce faster decisions

Opinion was expressed that face-to-face meetings would produce faster decisions. However, business people, government officials and B.C. Tel staff did not agree. They thought that conference TV would produce faster decisions.

Useful for busy people to meet via this medium

There appeared to be strong agreement that conference TV is useful for meeting people one may otherwise have no time to meet.

Easy to talk to people at one's own end

All participants agreed strongly that it was not difficult to talk to people at their own end.

Convenient for busy people

There was strong agreement that conference TV is convenient for busy people.

Hard to take notes

There was general agreement that it is slightly harder to take notes in conference TV meetings than in face-to-face meetings.

People pay attention to conference TV meetings

Most individuals agreed that people in their groups paid at least as much attention in the meeting as they would in face-to-face meetings. The UBC students disagreed. They felt that people paid less attention than they would in face-to-face meetings.

Feeling of privacy

The people felt that the medium provided an adequate feeling of privacy.

Concern about security

Most people felt strongly that they would be afraid of using the conference facility for information which may end up in the wrong hands.

Sense of realism induced

All groups agreed that the medium gave a great sense of realism.

The equipment was no distraction

All groups agreed that the equipment did not distract from the discussion.

Makes meetings shorter

Most participants, except the business people and the university students, felt that conference TV makes meetings shorter.

More concentration required

All groups, except members of the media, felt that more concentration is required than in face-to-face meetings.

Time pressure did not hurry meetings

All groups, except the UBC students, felt slightly that conference TV meetings were not hurried as a result of time pressure.

It did not cause unusual arguments and disagreements

On the average, participants felt that conference TV makes no difference as far as arguments and disagreements in meetings. However, business users and government officials felt that the medium did not reduce arguments and disagreements. Most other groups felt that the medium made a difference.

Good visibility of reactions by those at the other end

All groups felt that it was not hard to see the reactions of people at the other end.

No digression from the purpose of the meeting

Everyone agreed that the equipment did not cause digression from the purpose of the meeting.

No self-conscious feelings

Most people agreed that conference TV does not make them feel self-conscious.

Good for use of documents

Most people agreed that the medium was good for the use of documents.

Not strenuous to use

Everyone strongly agreed that regular use of conference TV would not be strenuous.

ATMOSPHERE OF FACE-TO-FACE MEETINGS (COMPARED TO CONFERENCE TELEVISION)

More friendly

All participating groups agreed that face-to-face meetings would be more friendly than conference TV meetings.

Less cautious

All groups agreed that face-to-face meetings would be less cautious than conference TV meetings, except the elementary school pupils who felt that face-to-face meetings would be more cautious.

More businesslike

Business groups, (except B.C. Tel employees), felt that face-to-face meetings would be less businesslike than conference TV meetings. All other groups felt that face-to-face meetings would be more businesslike.

Emotional - no difference

More groups felt that there would be no difference between face-to-face meetings and conference TV meetings. The exceptions were government officials, B.C. Tel staff and elementary school pupils, who felt that face-to-face meetings would be more emotional.

More Informal

All groups except business users, felt that face-to-face meetings would be more informal. The business groups felt that face-to-face meetings would be less informal.

More competitive

Everyone agreed that face-to-face meetings would be more competitive.

More serious

Most groups agreed that face-to-face meetings would be more serious than conference TV meetings. Only B.C. Tel employees felt that face-to-face meetings would be less serious.

More cordial

All groups agreed that face-to-face meetings would be more cordial.

Antagonistic - no difference

UBC students felt that face-to-face meetings would be less antagonistic than conference TV meetings. All other groups agreed that there would be no difference between the two meeting formats.

More heated

Most groups felt that face-to-face meetings would be more heated, except the clients being counselled and representatives of the media who felt that there would be no difference.

Hostile - no difference

Most groups felt that there would be no difference between face-to-face and conference TV, with respect to hostility. Some academics felt that face-to-face meetings would be less hostile.

More lively

There was general agreement that face-to-face meetings would be more lively than conference TV meetings. However, some felt that face-to-face meetings would be less lively.

More constructive

All groups agreed that face-to-face meetings would be more constructive.

More aggressive

All groups agreed that face-to-face meetings would be more aggressive, except the clients who were being counselled, who felt that there would be no difference.

Defensive - No Difference

All groups, except the UBC students, agreed that there would be no difference between face-to-face and conference TV meetings with respect to defensiveness. The students felt that face-to-face meetings would be more defensive.

More Cooperative

All groups agreed that face-to-face meetings would be more cooperative. Counselling clients felt that there would be no difference.

COMPARISON OF FACE-TO-FACE, CONFERENCE TV AND TELEPHONE COMMUNICATION

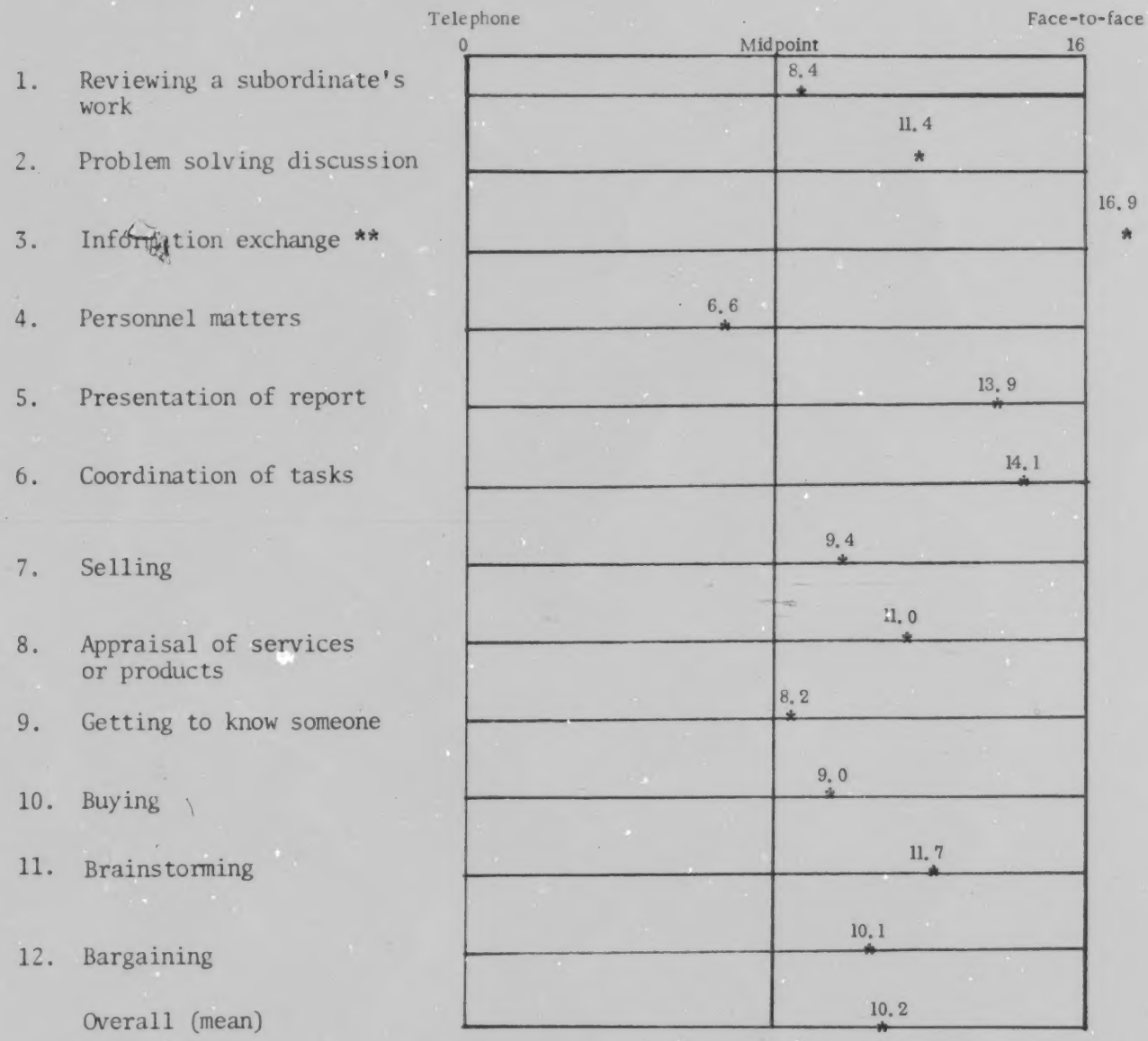
Generally, participants felt that face-to-face meetings were better than meetings via conference TV. This is true for all types of communication*, except simple information exchange, in which case the participants felt that conference TV would be better than face-to-face.

The fact that face-to-face meetings would be better than conference TV was expected, but an interesting discovery was made. When comparing three forms of communication, namely the telephone, conference TV and face-to-face, there were some surprising results. On a scale of quality of communication from the telephone at one end, to face-to-face at the other, it was expected that conference TV would be an improvement over the telephone, but closer to the telephone than to face-to-face. It was found, however, that conference TV was considered by the participants to be closer to face-to-face than to the telephone on the scale; i.e. the improvement of conference TV over the telephone is greater than the improvement of face-to-face over the conference TV for most types of communication.

The following chart illustrates that the participants generally felt that conference TV is better than the telephone to a greater extent than face-to-face is better than conference TV. For information exchange, it was felt that conference TV was even better than face-to-face.

Footnote: * The types of communications which were looked at: reviewing a subordinate's work, problem solving discussion, information exchange, personnel matters, presentation of report, coordination of tasks, selling, appraisal of services or products, getting to know someone, buying, brainstorming, and bargaining.

COMPARISON BETWEEN FACE-TO-FACE, CONFERENCE TV AND THE TELEPHONE FOR DIFFERENT TYPES OF COMMUNICATION



* Conference TV

** Conference TV better than face-to-face

technical

Three basic decisions were made about the characteristics of the conference television system. They were to use a 525 line monochrome system; to use transportable microwave equipment for the radio transmission between cities; and to use normal telephone circuits for audio and facsimile.

This section includes a description of the physical arrangement of the audio and video units, brief technical information on the equipment used, an outline of the transmission facility temporarily installed between the two cities, and notes on aspects which require particular attention.

PHYSICAL ARRANGEMENT

Camera and monitor location

In Victoria and Vancouver the relative positions of the camera and the incoming picture monitor were identical. The monitor was positioned just above the eye level of seated participants, and below that of a person standing. The television camera equipped with a 12.5mm lens, was mounted centrally and six inches above the monitor. This was about twelve inches above the level of the faces on the screen. These arrangements were made because other researchers had previously found that, in order to adequately simulate "face-to-face" conversation, the television camera must be positioned immediately above the incoming picture.

Theoretically this would enable participants to address individuals at the other end by looking at their image on the screen. However, this was only achieved effectively during the counselling session, when the 12.5mm lens was replaced with a 25mm lens, and the participants were seated about six feet from the camera.

Monitor size

The 23 inch monitor was mounted in the wall about 12 feet from the participants, and many people commented that the screen was not large enough to provide a comfortable view. Some of the participants found it fatiguing to concentrate for an hour or more on the monitor. In a normal meeting the eye has plenty of opportunity to move around, but in a television conference the monitor commands constant attention and reduces the opportunity for eye movement or change of eye focus. It is possible that the use of a single large

screen (several feet wide) would relieve eye strain by encouraging lateral movement of the viewers' eyes.

Lighting

To keep the conference room environment as natural as possible, lighting was limited to normal fluorescent ceiling fixtures, without key, modelling or back lighting. This produced about 130 footcandles of surface illumination on the participants. The Plumbicon camera was sufficiently sensitive to produce a picture that contained virtually no noise with this level of light; however, the gray scale rendition and the shadow effect on the faces of the participants was not ideal. Light-colored surfaces, especially the top of the conference table, would help offset shadows from overhead lighting. Light sources should be provided to direct light upwards towards the faces of the participants. If key lighting could be arranged without causing distraction or excessive heat, it would be useful to help separate subjects from the background.

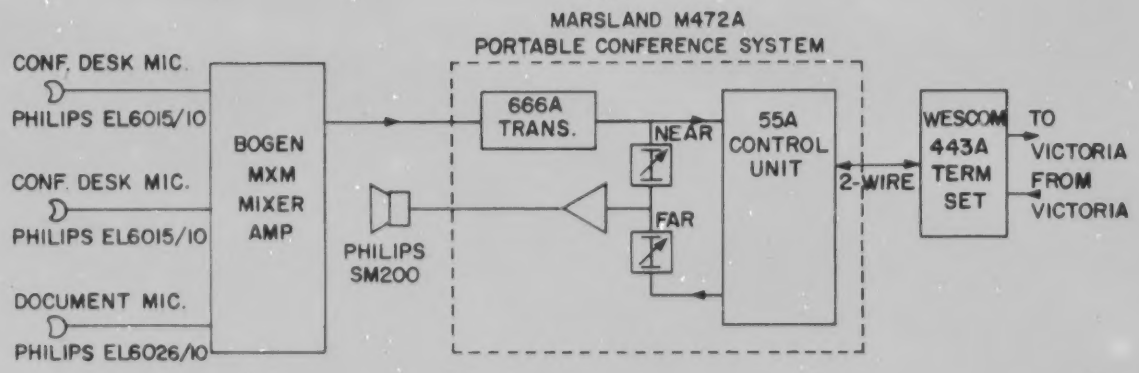
Illustration

A white flip chart on an easel in front of the conference table was found to be better than the back-wall blackboard. But the most effective way of illustrating was found to be simply writing on a piece of paper placed under the document camera.

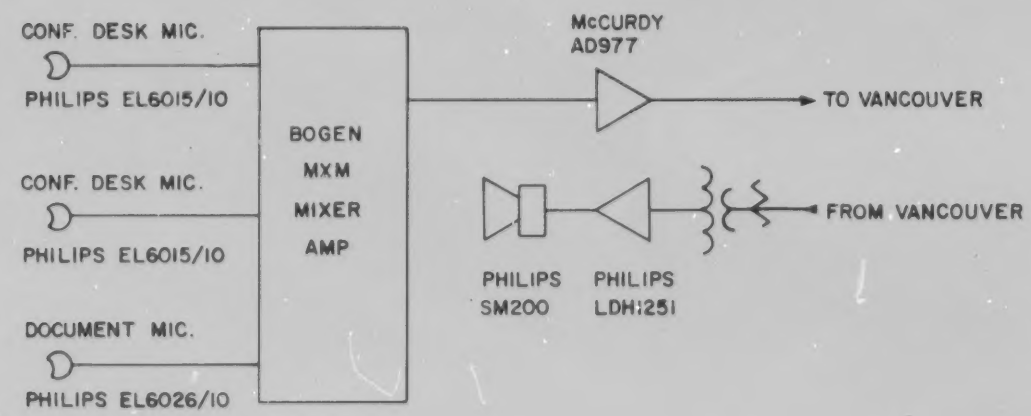
AUDIO

The sound system used voice-quality channels between Vancouver and Victoria and a portable audio conferencing system to provide level control and feedback suppression. The conferencing unit reduced the gain from Victoria when Vancouver was speaking and reduced gain in the Vancouver transmit path when no one was speaking from there.

VANCOUVER



VICTORIA



To further improve feedback suppression, a tuned suppression filter was inserted in the audio path to inhibit 1000 Hz feedback which would otherwise have been caused by the total system propagation delay time of 1 millisecond around the transmission path.

A more efficient approach would be to minimize the coupling between the speaker system and the microphones by acoustic treatment of the room surfaces; in this experiment, the wall materials were non-absorbent except for curtains across the back wall.

The loudspeakers were originally mounted in the end wall above the monitor. Audio quality was considerably improved when they were moved to positions in the ceiling above the monitor and facing downwards towards the carpeted floor.

For a successful conference the aim should be natural sound quality and an absolute minimum of background noise. The major difficulty is the achievement of true full duplex operation.

The choice and placement of the microphones required careful attention. It was distracting and uncomfortable if the participants had to be seated close to the microphones in order to be heard. Good communication was reinforced when the speaker could move about freely behind the conference table with little change in sound volume at the other end. The use of microphones that pin on the clothes is not effective because in a conference there is a tendency to leave and join the conference at any time. If the conference system requires that the participants pay attention to the technology then the atmosphere of open communication is lost.

VIDEO

Picture quality

The picture quality, viewed on the 23 inch monitor for the incoming picture and the 11 inch for the outgoing picture, was limited only by deliberately "non-production" techniques, as the transmission facilities comprised equipment normally used for studio-to-transmitter broadcast links.

Since the main conference cameras were broadcast quality television units, and the basic format of the system conformed to the North American 525 lines broadcast standard, the picture was comparable to good quality broadcast reception.

Transmission of documents

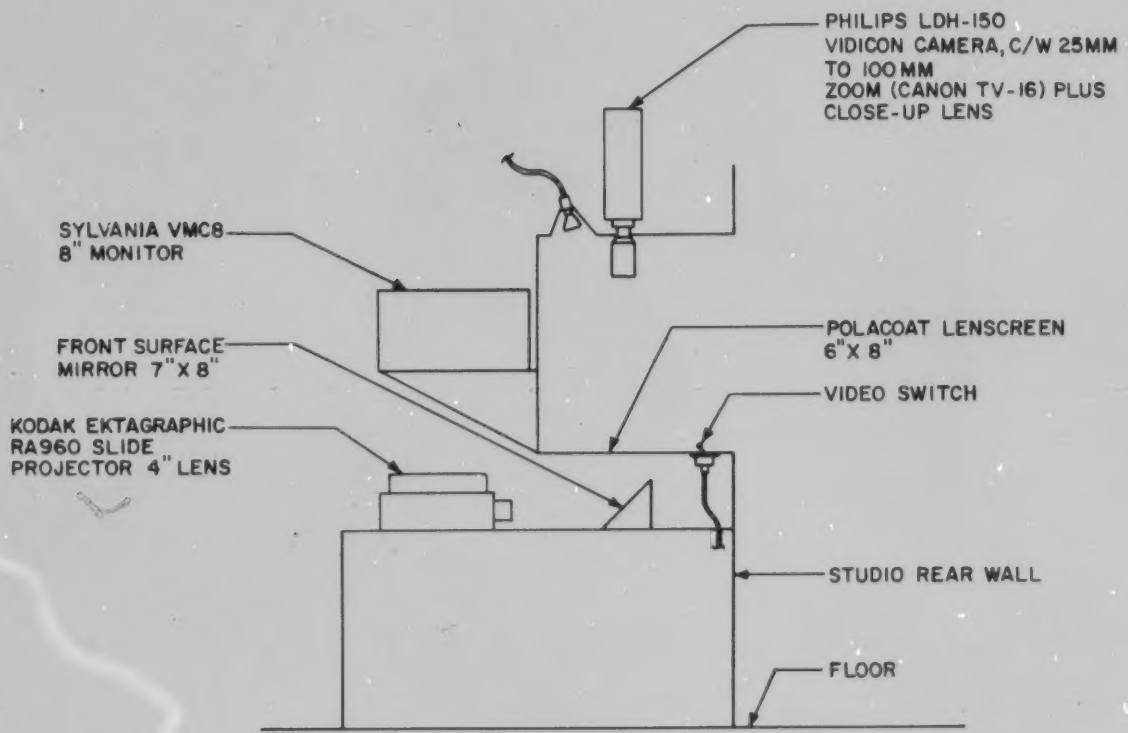
A document-viewing television camera was installed in a cubicle in the back of the conference room. This unit could be switched on to the outgoing video channel, and was used to transmit both documents and slides.

To improve the versatility of the camera the document surface was a glass pola-coat screen. A 35mm projector, located below, projected slides on to this screen via a front silvered mirror. The image was then picked up by the document camera and transmitted to the other location. This arrangement made it easy for the user to point to areas on the image in the same way as with a document placed under the camera.

The document camera arrangement had good potential, but it was suggested later that it would have been even more functional if

the document camera had been mounted in the ceiling directly over the conference table. The screen could then be an integral part of the table top, with the slide projector mounted in a compartment within the conference table. It was suggested that such an arrangement would be more convenient on those occasions when all participants at the conference table had to work on a particular document or series of slides.

DOCUMENT / SLIDE CAMERA ARRANGEMENT



Complete drawings or typewritten pages were transmitted by facsimile, using standard equipment which was dialed up when required over normal telephone circuits. It required three minutes or six minutes to transmit a complete page.

Some planning was necessary to use the facsimile effectively, to ensure documents were sent in advance of the discussion.

Transmission facilities

Portable microwave equipment was used for the two-hop radio system. The 40 mile hop between Vancouver and Saltspring Island shared existing waveguide and antenna systems and the 24 mile hop between Saltspring Island and Victoria used portable antennas.

A clamping-equalizer amplifier was used at Vancouver because of the long cable trunk from Vancouver Radio to the conference room.

Normal voice-quality message circuits were used for audio between the two cities, with the addition of an amplifier at Victoria to improve the signal-to-noise ratio between the conference room and the toll office, and to facilitate patching a standby circuit carried above video on the microwave channel.

appendix

POST-TRIAL INTERVIEW - CHECKLIST OF QUESTIONS

1. What's your general reaction?

2. The "efficiency" of the medium?

3. Were there any distractions today?

4. Was the monitor in front of you a distraction?

5. Would you remove the monitor if you had a choice?

6. Were you sometimes addressing the monitor?

7. Do you have any comments about the image?

8. If you were describing this to someone --
   a) Would you describe it as a better telephone? or
   b) Would you describe it as a substitute for travel?

9. How would you describe people you see on conference TV?

10. Is there a loss of communication via this means?

11. If I were in the same room as you how would you check that you communicate (non-verbally)?

12. Why would someone be willing to tell things via telephone or conference TV which they won't tell face to face?

13. How many new people have you met today?

14. Did you count us? Do you feel you met us today?

15. If you were to meet with someone you didn't like, would you meet face-to-face or by conference TV?

16. What kind of meeting would you not use this for?

17. How about sales discussion?

18. Do you have any personal experience in interviewing people?

19. Would you use this system for the type of interview you do?

20. If the service was operating would you want to try it again?

QUOTES FROM INTERVIEWS

"I like it...it makes so much sense." - Government official

"It gives you much more rapport than conference telephone calls." - Business User

"A serious concern would be privacy." - Businessman

"Privacy is no problem." - Businessman

"I feel that there is probably a good market for this kind of thing." - Business User

"I think we found that people were more precise. They didn't fool around as much." - Businessman

"All our eyeballs are directed one way. Our eyeball swing is much greater in a group situation. I am much more aware of the ordinary proximity of bodies next to me than I would be in an ordinary room." - Student

"I feel very passive. As soon as I feel that I have to look at a screen I automatically shut off. However, I think that when someone I know is speaking, it means something because I know them. If I haven't seen them before it would just be complete nothingness." - Student

"The point about not seeing the eyes is very important. You may not be people over in Victoria at all. You may just be a very good animated cartoon." - Student

"This kind of medium does create some barrier of a psychological nature." - Student

"As long as this threat persists [the power position of the television set] I don't think it is of much use as an education device." - Student

"I've seen it misapplied in a sense." - Student

"It's been a very passive participation like an artificial situation created rather than any real involvement situation." - Student

"The potential is tremendous." - Government Official

"It doesn't substitute personal contact but the telephone does a lot of things for you that there is no other way of doing -- this is perhaps a more sophisticated telephone." - Businessman

"I'm sure we could find an application for this type of meeting in our organization. We could save ourselves a lot of money if we had a system between each large center." - Businessman

"People don't come across as strong physically as they would in a face-to-face conversation." - Businessman

"This can't be compared to telephone - it's unique." - Businessman

"One can detect non-verbal communication." - Businessman

CONFRAVISION

USER OPINION QUESTIONNAIRE

B.C. TELEPHONE COMPANY

1973

B.C. Tel hopes this has been an interesting experience for you. Now we would like to get your evaluation of the Confravision meeting you have just attended. This will enable us to work towards a possible continuing service of this type.

Would you please answer the attached questions. It will only take a few minutes.

If you would like to schedule another meeting by Confravision, please talk to the Receptionist about a time.

A. Background Questions:

1. Today's date: .....

2. Name of your organization .....

3. Your title .....

4. Thinking back to your last working week, please estimate how many 'long distance' telephone calls you made .....

5. How many meetings have you attended in the past week?

   a) Number of meetings in your own office building .....
   b) Number of meetings in another building within the city area ....
   c) Number of meetings in other cities .....

6. Considering your present amount of travel to meetings, would you prefer:

   MORE _____ SAME _____ LESS _____ travel?

B. Questions on this Confravision meeting

1. Approximately how long did the Confravision meeting last? .....

2. Confravision location: Vancouver: _____ Victoria: _____

3. Reason(s) for the meeting (please check)

a) Reviewing a subordinate's work .....

b) Problem solving discussion .....

c) Information exchange .....

d) Personnel matters .....

e) Presentation of report .....

f) Delegation of work .....

g) Crisis decision making .....

h) Appraisal of services or products .....

i) Buying or selling .....

j) Getting to know someone .....

k) Generating ideas .....

l) Bargaining .....

m) Trying out Confravision .....

n) Other purpose (specify) .....

4. Your principal role at the meeting was:

PARTICIPANT .....

OBSERVER .....

CHAIRMAN .....

5. Have you used Confravision before? YES ____ NO ____

6. If yes, give dates. .....

7. How many people were at your end? (please circle) 1 2 3 4 5 more

8. How many people were at other end? (please circle) 1 2 3 4 5 more

C. Statements about Confravision

Here are some statements about Confravision. Please indicate how strongly you agree or disagree with them, by marking the appropriate box.

If you STRONGLY AGREE	mark	YES
If you AGREE ON THE WHOLE	mark	yes
If you NEITHER AGREE NOR DISAGREE	mark	0
If you DISAGREE ON THE WHOLE	mark	no
If you STRONGLY DISAGREE	mark	NO

1. I would be willing to use it for discussing a confidential matter.

YES yes 0 no NO

2. One gets no real impression of personal contact with the people at the other end.

YES yes 0 no NO

3. It is very straightforward and easy to use.

YES yes 0 no NO

4. One can never be certain just who was at the other end.

YES yes 0 no NO

5. It is inconvenient to have to go to a remote location for a Confravision meeting.

YES yes 0 no NO

6. The system gives one a feeling of 'confrontation' with the people at the other end.

YES yes 0 no NO

7. It is easy to tell if people in the other group are following the discussion.

YES | yes | 0 | nc | NO

8. A face-to-face meeting would produce decisions more quickly.

YES | yes | 0 | no | NO

9. It is useful as a means of meeting people one would not otherwise have time to.

YES | yes | 0 | no | NO

10. It is difficult to talk to people at one's own end.

YES | yes | 0 | no | NO

11. The system is especially convenient for busy people.

YES | yes | 0 | no | NO

12. It is easier to make notes than in a face-to-face meeting.

YES | yes | 0 | no | NO

13. People in our group seem to pay less attention than they would in a face-to-face meeting.

YES | yes | 0 | no | NO

14. The system enables one to feel that the meeting is being held in private.

YES | yes | 0 | no | NO

15. I would tend to avoid using it if I were going to discuss anything which I didn't want to end up in the wrong hands.

YES | yes | 0 | no | NO

16. It provides a great sense of realism.

YES | yes | 0 | no | NO

17. The telecommunications equipment distracts one from the ongoing conversation.

YES | yes | 0 | no | NO

18. Using the system tends to make meetings shorter.

YES yes 0 no NO

19. One has to concentrate less than in a face-to-face meeting.

YES yes 0 no NO

20. The time pressure caused by using the system might make one come to decisions that were too hurried.

YES yes 0 no NO

21. I believe that using the system would reduce the number of arguments and disagreements at meetings.

YES yes 0 no NO

22. One does not get a good enough idea of how people at the other end are reacting.

YES yes 0 no NO

23. The equipment caused me to digress from the purpose of the meeting.

YES yes 0 no NO

24. The system makes one feel self-conscious.

YES yes 0 no NO

25. The system is fine for meetings where one needs to show documents.

YES yes 0 no NO

26. I think that I would find regular use of confravision a bit of a strain.

YES yes 0 no NO

D. Does Confravision affect the atmosphere of the meeting?

If this meeting had been face-to-face rather than Confravision, I think the atmosphere of the meeting would have been .....
(please check one alternative for each adjective).

1.	more friendly	_____	less friendly	_____	no different _____
2.	more cautious	_____	less cautious	_____	no different _____
3.	more businesslike	_____	less businesslike	_____	no different _____
4.	more emotional	_____	less emotional	_____	no different _____
5.	more informal	_____	less informal	_____	no different _____
6.	more competitive	_____	less competitive	_____	no different _____
7.	more serious	_____	less serious	_____	no different _____
8.	more cordial	_____	less cordial	_____	no different _____
9.	more antagonistic	_____	less antagonistic	_____	no different _____
10.	more heated	_____	less heated	_____	no different _____
11.	more hostile	_____	less hostile	_____	no different _____
12.	more lively	_____	less lively	_____	no different _____
13.	more constructive	_____	less constructive	_____	no different _____
14.	more aggressive	_____	less aggressive	_____	no different _____
15.	more defensive	_____	less defensive	_____	no different _____
16.	more cooperative	_____	less cooperative	_____	no different _____

E. I. Technical Aspects

1. The distance from you to the picture monitor was:

too small _____:_____:_____:_____:_____:_____:_____ too great

2. The image size of the distant conferees was:

too small _____:_____:_____:_____:_____:_____:_____ too large

3. The picture quality was:

completely satisfactory _____:_____:_____:_____:_____:_____:_____ completely unsatisfactory

COMMENTS _____

_____

4. Was document camera used? YES _____ NO _____

If yes, the document camera system was:

completely satisfactory _____:_____:_____:_____:_____:_____:_____ completely unsatisfactory

COMMENTS _____

_____

E. II Audio

5. The voice quality was:

completely satisfactory _____:_____:_____:_____:_____:_____:_____ completely unsatisfactory

COMMENTS _____

_____

6. The volume was:

too low _____:_____:_____:_____:_____:_____:_____ too high

7. The position of the microphones was:

completely satisfactory _____:_____:_____:_____:_____:_____:_____ completely unsatisfactory

COMMENTS _____

_____

E. III Environment

8. The room decor was:

completely satisfactory ____:____:____:____:____:____:____ completely unsatisfactory

Comments _____

_____

9. The furnishings were:

completely satisfactory ____:____:____:____:____:____:____ completely unsatisfactory

Comments _____

_____

10. The lighting was:

completely satisfactory ____:____:____:____:____:____:____ completely unsatisfactory

Comments _____

_____

F. Confravision and Your Organization

1. Could Confravision become a useful tool in your organization's operations?

YES ____ For what function(s) (Pls. explain) _____

NO ____ _____

2. Did you use any of the auxiliary equipment provided? (Please tick)

- Speakerphone YES _____ NO _____
- Faxcom YES _____ NO _____
- Slide projector YES _____ NO _____
- Document Viewer YES _____ NO _____
- Flip Chart YES _____ NO _____
- Blackboard YES _____ NO _____

3. What additional equipment would have been useful to your meeting?

_____

_____

4. If one group had to travel to the distant city for the meeting, would the same number of participants have been involved?

YES _____ NO _____

If no, how many would be dropped? _____

5. Approximately what would be the cost per person if one group had travelled to the distant city for the meeting?

Transportation _____

Accommodation _____

Food _____

Value of time lost to work location _____

6. How many people would have travelled? _____

_____

7. a) In what cities (other than Vancouver and Victoria) do you most frequently hold group discussion meetings?

_____

_____

b) From which other cities (than those listed in 7 a) would participants come to attend meetings?

_____

_____

8. In the future, would you be willing to use Confravision facilities on:

a) Telephone Company premises YES _____ NO _____

b) Hotel or other central location YES _____ NO _____

c) Your own conference room YES _____ NO _____

9. In your opinion, could Confravision be used by your organization to replace travel for meetings?

Yes, possibly replace up to 25% of travel

Yes, possibly 26% - 50%

Yes, over 50%

No, cannot replace travel

If no, please state reasons _____

_____

10. Could you have conducted the meeting as successfully without TV, that is, with audio only?

YES _____ NO _____

If no, please explain _____

_____

11. Would you use Confravision service again? YES _____ NO _____

If no, please explain _____

_____

G. Conference TV compared to other systems

1. Had this Confravision meeting not been possible, how would the equivalent transmission of information have occurred? (check one or more).

A) IT WOULD NOT HAVE OCCURRED _____

B) BY TRAVEL TO THE OTHER LOCATION _____

C) BY A LONG DISTANCE CONFERENCE CALL (a multi-location operator connected telephone call) _____

D) BY A SERIES OF LONG DISTANCE CALLS _____

E) BY A SPEAKERPHONE CALL _____

F) BY TWX, TELEX, OR TELEGRAM _____

G) BY MAIL _____

H) OTHER (Please specify) .....

2. In the normal course of business, about how often do you use the following modes of communication for group discussion or for display?

Modes of Communication	Approx. Freq. per month
Intercity travel	.....
Operator-handled long dist. conference call	.....
Speakerphone conference	.....
Closed circuit television	.....

H. CONFRAVISION AND FACE-TO-FACE COMPARISON

Here follows a list of meetings, described by their purposes. Please compare Confravision with face-to-face for each of these meetings by ticking the appropriate box.

1. REVIEWING A SUBORDINATE'S WORK

Confravision would be:				Face-to-face would be:		
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

2. PROBLEM SOLVING DISCUSSION

Confravision would be:				Face-to-face would be:		
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

3. INFORMATION EXCHANGE

Confravision would be:				Face-to-face would be:		
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

PERSONNEL MATTERS

Confravision would be:

Face-to-Face Would be:

much better	better	slightly better	same	slightly better	better	much better
☐	☐	☐	☐	☐	☐	☐

5. PRESENTATION OF REPORT

Confravision would be:

Face-to-face would be:

much better	better	slightly better	same	slightly better	better	much better
☐	☐	☑	☐	☐	☐	☐

6. COORDINATION OF TASKS

Confravision would be:

Face-to-face would be:

much better	better	slightly better	same	slightly better	better	much better
☐	☐	☐	☐	☐	☐	☐

7. SELLING

Confravision would be:

Face-to-face would be:

much better	better	slightly better	same	slightly better	better	much better
☐	☐	☐	☐	☐	☐	☐

8. APPRAISAL OF SERVICES OR PRODUCTS

Confravision would be:

Face-to-face would be:

much better	better	slightly better	same	slightly better	better	much better
☐	☐	☐	☐	☐	☐	☐

9. GETTING TO KNOW SOMEONE

Confravision would be:

Face-to-face would be:

much better	better	slightly better	same	slightly better	better	much better
☐	☐	☐	☐	☐	☐	☐

10. BUYING

Confravision would be:					Face-to-face would be:	
much better	better	slightly better	same	slightly better	better	much better

11. BRAINSTORMING

Confravision would be:					Face-to-face would be:	
much better	better	slightly better	same	slightly better	better	much better

12. BARGAINING

Confravision would be:					Face-to-face would be:	
	better	slightly better	same	slightly better	better	much better

I. CONFRAVISION AND TELEPHONE CALL COMPARISON

Here follows the same list of meetings. This time please compare Confravision with a telephone call for each of these meetings, placing a tick in the appropriate

1. REVIEWING A SUBORDINATE'S WORK

Confravision would be:					Telephone would be:	
much better	better	slightly better	same	slightly better	better	much better

2. PROBLEM SOLVING DISCUSSION

Confravision would be:					Telephone would be:	
much better	better	slightly better	same	slightly better	better	much better

3. INFORMATION EXCHANGE

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

4. PERSONNEL MATTERS

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

5. PRESENTATION OF REPORT

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

6. COORDINATION OF TASKS

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

7. SELLING

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

8. APPRAISAL OF SERVICES OR PRODUCTS

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

9. GETTING TO KNOW SOMEONE

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

10. BUYING

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

11. BRAINSTORMING

Confravision would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

12. BARGAINING

Confravison would be:					Telephone would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

Did you use Audio-only for a limited period during your Confravision meeting today?

YES _____ NO _____

If yes, please complete the following list of questions. If no, please proceed to the last page.

J. CONFRAVISION AUDIO-ONLY COMPARISON

Here follows the same list of meetings as above. This time please compare Confravision with Audio-only.

1. REVIEWING A SUBORDINATE'S WORK

Confravision would be:					Audio would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

2. PROBLEM SOLVING DISCUSSION

Confravision would be:					Audio would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

3. INFORMATION EXCHANGE

Confravision would be:					Audio would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

4. PERSONNEL MATTERS

Confravision would be:					Audio would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

5. PRESENTATION OF REPORT

Confravision would be:					Audio would be:	
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

6. COORDINATION OF TASKS

Confravision would be:						Audio would be:
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

7. SELLING

Confravision would be:						Audio would be:
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

8. APPRAISAL OF SERVICES OR PRODUCTS

Confravision would be:						Audio would be:
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

9. GETTING TO KNOW SOMEONE

Confravision would be:						Audio would be:
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

10. BUYING

Confravision would be:						Audio would be:
☐ much better	☐ better	☐ slightly better	☐ same	☐ slightly better	☐ better	☐ much better

11. BRAINSTORMING

Confravision would be:						Audio would be:
☐	☐	☐	☐	☐	☐	☐
much better	better	slightly better	same	slightly better	better	much better

12. BARGAINING

Confravision would be:						Audio would be:
☐	☐	☐	☐	☐	☐	☐
much better	better	slightly better	same	slightly better	better	much better

To summarize: We would appreciate your general comments about Confravision:

_____

_____

_____

_____

_____

_____

MANY THANKS FOR YOUR PARTICIPATION
AND FOR TAKING THE TIME TO COMPLETE
THE QUESTIONNAIRE.

Please return to:

A.S. Skoe
Socio-Economic Studies
B.C. Telephone Company
768 Seymour Street
Vancouver 1, B.C.

QUOTES FROM OPEN-ENDED QUESTIONS IN THE QUESTIONNAIRE

"Great!...Users should be warned that if they are presenting information or reports that, to interest their 'viewers' they must also 'entertain' them: i.e. audio-visual material, varied pace, question periods, but not straight talking. We, as TV viewers, 'turn-off' anything monotonous."

"....After 2-1/2 hours in that room I felt like I had been in an airplane. After too much time in there one stops interacting with the other 'TV'. Users should be cautioned to stay within certain time limits. One hour maybe."

"Excellent in terms of cutting travel and time costs. Please accept that many questions in this evaluation were answered on the basis of a subjective assumption of what a business meeting would be like. Some were too difficult to assume. Possibilities could be good for use in education."

"The presentation of educational material had great possibilities that were not taken advantage of there... It requires a two-way exchange to be effective."

"Really enjoyed the opportunity... I feel <u>now</u> that more time could have been spent in a two-way discussion, because of comment by the class. This was an exciting experience for me. Thank you for all your assistance, Anders."

"In general, a very effective device for business conferences, and for bringing education and medicine aid to remote communities."

"It makes you nervous at first but later you'll settle down. People are so much friendlier but you can get bored easily."

"It does allow participants to get beyond the media, into a meaningful meeting of minds."

"A surprisingly successful conference: the agenda was unstructured except for 3 items and the conference was to some extent brainstorming. I think the media improved resolution time and led to a productive solution -- yet we did not seem constrained or limited. Because of the problem of taking notes (I found this quite difficult) I wonder if a videotape recording could be made for later summarization. Yet, because of the problem each of us seemed to have to summarize the proceedings frequently and this may have led to more rapid problem resolution. An "overhead projector" type of unit would have been useful - the blackboard was not in our camera range (narrow range was used at our end) and even if it had been, getting up and writing would have been too 'teaching' for the group dynamics we sought. But jotting notes on a screen while sitting would have been easy. The camera would have picked up an overhead easily. Many thanks for the opportunity."

"I found it as good as a personal meeting - in fact, less distraction."

"This is a great thing! I see many possibilities for therapy of all kinds... It is private, safe, personal, comfortable and a reliable convenient way to have a conference. I see many possibilities for business as well. Thanks!"

"A most enjoyable experience. Feel this is the communication of the future. Much depends on the availability and of course costs. Thank you for the opportunity."

"We can see this as a very useful means of communicating although we were only doing it between Victoria and Vancouver. We can see it of more value between say Calgary and Victoria - Edmonton and Victoria - Toronto and Victoria, etc. Costs would be important as it would have to be compared with reduced travel."

"After initial 'shock' it was business as usual almost. Meeting conducted in a more light-hearted manner than usual. Everyone participated as much as they normally would. More enjoyable than ordinary meetings."

"I would say that the system could be of value for specific conferences. However, the nature of our business is such that for every day occurrences we could not travel from our office to another for a conference television meeting."

"Found it an interesting medium - quite enthused about future possibilities if costs were in accord with travel. Could even augment our travel rather than replace it, i.e. an additional operating tool."

"A useful medium. Would become more useful as I became more accustomed to the medium. Arranging for use and travel from office would present a problem not presently faced in using L.D. telephone."

"I found this a most useful method of communication -- have no criticisms whatsoever. Would be most useful and in particular to distant cities, i.e. Ottawa. I was most impressed."

"This was a regular monthly meeting. I was impressed with the ease of conducting the meeting and the discussions that followed. There were no 'strangers' participating."

"Improved picture quality would be helpful. Because of the short travel time between Vancouver and Victoria, I have doubts as to its application in this area. Vancouver to Ottawa would be a different matter. But cost would be an important consideration."

"Can be used as an effective communicative tool. It has distinct advantages over audio communication especially when charts, graphs or other visual displays need to be used. It will never replace a face-to-face meeting but is a good compromise when time and/or money are critical factors."

"Topics should be carefully selected -- possibly following exchange of letters. Lacks personal warmth of a face-to-face meeting. Videotape record for later review of documents or as tape if no documents in use would be a good record. Conference should be of a high priority in order to justify costs. Use would depend on more drop centers and ready availability."

"The use with classrooms would be very useful. The Forest Ranger visits most rural schools annually but city pupils are seldom visited. This could be an excellent means to save time if it could be used with piped-in TV."

"It was a useful exposure to a new approach to the use of this media -- but it had the aspect of using it as a toy -- and this may have contributed to the negative results. Also with some knowledge of the cost of the broadband facility used, its practical application as a regularly used tool (with a cost/effective consideration) caused some of the negative conclusions."

"The audio facility was a significant improvement over the conference call/loud speaking telephone system presently used. This is an area for further study."

"A good substitute for face-to-face meeting! Audio performance of prime importance. Slow scan picture could be adequate for normal type meeting to reduce costs."

"I enjoyed it very much. In the future if it is decided to offer it as a service, it should be extended to other distant points, i.e. Toronto, Montreal, etc. Better audio quality is required -- how about color TV and a large screen. Also I have never met Laurel in person but over conference TV we have become good friends."

"Generally good: suggest much larger viewing screen perhaps rear screen projection wall size; closer view of faces so that expressions can be seen and appraised; ability to handle larger groups on camera - 10-15; sound quality must be improved; ability to use newsprint board and flip charts."

"Impressive, works well and easy to use."

"One has the concern that "big brother" might be watching, that one cannot interrupt as easily as face-to-face because subtle motions go unnoticed."

"Better than a loud speaking telephone call but not as good as face-to-face. I don't think the extra cost of the video is justified by the benefits."

"Good! Saved me 3/4 of one day in time. Met personnel I would not normally have time to meet."